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July 19, 1996

RSPA-1996-12679

The U.S. Dept. of Transportation
Office of Hazardous Materials Standards
400 Seventh St., Southwest, Room No. 8430
Washington, D.C. 20590
Tel. (202) 366-4488 / Fax (202) 366-8700

RE: Petition for rule making affecting sections 173.24a, 178.602, and 178.603 of Title 49 of the Code of Federal Regulations, relating to the drop test methods that are to used when evaluating performance-oriented non-bulk packagings.

Dear Ladies and Gentlemen:

I feel the need to inform you of the following inconsistencies and discrepancies concerning the specific test methods and procedures that some DOT-accredited third party packaging certification agencies and packaging manufacturers whom elect to test and self-certify their own containers, either have or do continue to use when they evaluate a packaging's ability to successfully endure the drop tests which are discussed in 49 CFR 178.603. More importantly, I would urge RSPA to undertake a rule making action in order to provide the clarification that I feel is necessary to ensure that all performance-oriented non-bulk packagings are evaluated equally for compliance with and concerning their ability to pass the drop tests that are prescribed in 49 CFR 178.603. Please recognize, that the types of single non-bulk packagings that I am mainly referring to throughout the remainder of this letter, are open head and closed head pails, drums, and jerricans which are intended for use in transporting aqueous ladings.

To begin with, 49 CFR 173.24a(b)(3) presently states that "a single or composite non-bulk packaging which is tested and marked for liquid hazardous materials may be filled with a solid hazardous material to a gross mass, in kilograms, not exceeding the rated capacity of the packaging in liters, multiplied be the specific gravity marked on the packaging, or 1.2 if not marked." Hence, many including myself have interpreted this to mean that one could use a packaging that was tested and marked for liquids for purposes of transporting solid materials, by multiplying the rated capacity (expressed in liters) of the container by the specific gravity for which it was tested in order to derive the maximum gross mass (i.e., the combined weight of the packaging and its contents). For instance, a 20 liter container that was tested and marked for Packing Group II liquids with a specific gravity of 1.8, and weighs 1.5 kilograms when it is empty, could be used to transport as much as 34.5 kilograms of a solid material if one were to calculate the gross mass using the mathematical formula that is provided in 49 CFR 173.24a(b)(3) and subtract the weight of the empty packaging from the 36 kilogram gross mass.

However, I recently learned that some DOT-accredited third party packaging certification agencies and packaging manufacturers evaluate a packaging's ability to endure the drop tests which are discussed in 49 CFR 178.603 at slightly different test intensity levels (i.e., the mass of the filled container and the package drop height differ) by taking the interpretation that packagings can be filled with antifreeze, water, or other liquid substance that shares the essentially the same physical characteristics (e.g., relative density and viscosity) as the intended ladings and additional weights (e.g., bags of lead shot) to the gross mass that corresponds with the specific gravity for which they will be marked, and can then be drop tested from the base line drop heights that are listed in 49 CFR 178.603(e)(1) (i.e., 1.8 meters for packagings intended to contain Packing Group I materials, 1.2 meters for P.G. II materials, and 0.8 meter for P.G. III materials), which can dramatically increase the package's (i.e., the filled container's) ability to successfully endure the required drop tests due to the lessened gross mass of the packages.

Citing the same 20 liter container as an example, one may find that the container's actual fluid volumetric capacity is considerably greater than its nominal or rated capacity. Let's assume that the container will actually hold 22 liters of water when it is completely full and all entrapped air that would normally occupy the headspace has been removed. One would ordinarily fill the container to "98% of [its] maximum capacity" in accordance with 49 CFR 178.602(b), which is generally understood to mean the containers marked fluid capacity plus any outage, ullage, or headspace that may exist. In this particular case, the 10% outage that has been designed into the container results in filling the container with an additional 2 kilograms of water, thereby increasing the gross mass by 2 kilograms. To further compound the problem, one would then determine that the package needs to be drop tested from an elevation of 1.8 meters by applying the provisions of 49 CFR 178.603(e)(2)(ii)(B). Therefore, one would drop the heavier package from a height of 1.8 meters, which will greatly reduce its chance of passing the test at the same intensity levels that could be marked on the same container if one had filled it so as to achieve the gross mass that corresponds with the specific gravity for which it is to be marked with water and additional weight (e.g., bags of lead shot), and had dropped it from a height 1.2 meters in accordance with the provisions of 49 CFR 178.603(e)(1)(ii). The distinction that I am trying to make here, is that 49 CFR 173.24a(b)(3) permits packagings which have been properly tested (i.e., were previously filled to 98% of their maximum capacities and drop tested from the heights that are specified in 49 CFR 178.603(e)(2)(ii) whenever the specific gravity of the intended ladings exceeds 1.2) and are marked for liquids to be filled with a solid material; whereas, some DOT-accredited third party packaging certification agencies and packaging manufacturers assess a packaging's ability to endure the required drop tests by assuming that they are allowed to fill the container so as to achieve the gross mass that corresponds with the specific gravity for which it is to be marked and then drop test the package from the elevation that is specified in 49 CFR 178.603(e)(1)(ii). Is RSPA aware of any attempts that have been made by the Technical Committee 261/Subcommittee 1/Working Group 6 (i.e., TC261/SC1/WG6) of the European Standards Organization (CEN), to clarify which of the previously mentioned methods should be used to conduct the drop tests in accordance with the guidelines that are found in sections 9.7.2 and 9.7.3 of Chapter 9 of the UN Recommendations on the Transport of Dangerous Goods?

Consequently, I feel that it would be prudent for RSPA to undertake a rule making action in order to provide additional clarification in 49 CFR 178.603(e)(1) in order to ensure that all performance-oriented non-bulk packagings are evaluated equally for compliance with and

concerning their ability to endure the drop tests that are prescribed in 49 CFR 178.603. I would like to suggest that RSPA attempt to clarify the requirements of 49 CFR 178.603(e)(1), by indicating that filling a container to its rated capacity with water, antifreeze, or other liquid substance that shares the same physical characteristics as the intended ladings and using additional weight in order to achieve the gross mass which corresponds with the specific gravity that the container will be marked for, can not be tested using the drop heights that are specified in 49 CFR 178.603(e)(1). Additionally, I would like to recommend that RSPA should also indicate, that whenever a packaging is filled with water, antifreeze, or other liquid and additional weight (e.g., a bag of lead shot) and is to be tested using the drop heights that are specified in 49 CFR 178.603(e)(1), the packaging must be filled to 98% of its maximum capacity and that the gross mass for which it is filled must be determined by taking into consideration, the packaging's increased volumetric capacity and the specific gravity that it will be marked for whenever the specific gravity of the intended ladings exceeds 1.2 and that the additional weight must be evenly distributed within the container in such a manner that it allows one to administer the impacts in accordance with the provisions of 49 CFR 178.603(a). I personally tend to question whether or not someone can actually drop a container (e.g., a pail, drum, or jerrican) that is not perfectly symmetrical, which has been filled with water and contains a bag of lead shot that occupies a very small space within the container, diagonally on a chime, circumferential seam, corner, edge, or closure with the center of gravity directly above the point of impact with any real degree of accuracy, due to any angular or rotational movement or changes with respect to the package's center of gravity that may be caused by the addition of a concentrated weight.

Lastly, I wanted to get RSPA's opinion about the following hypothetical situation. Which test method would RSPA prefer to see someone use if they suspect or knows with reasonable certainty that drop testing packagings that are intended for use in transporting aqueous ladings with a specific gravity that exceeds 1.2, which have been filled with liquid and additional weights so as to achieve the gross mass that corresponds with the specific gravity for which they are to be marked, from the appropriate height that is specified in 49 CFR 178.603(e)(1) will allow the packagings to pass the test; however, the same packagings are likely to fail (e.g., break, tear, rupture, burst, or leak) when they are filled to 98% of their maximum capacities and drop tested using the heights which are discussed in 49 CFR 178.603(e)(2)(ii)?

In conclusion, I can not see how anyone can dispute the fact that ambiguity has resulted in various interpretations and procedural differences concerning the way which many DOT-accredited third party packaging certification agencies and packaging manufacturers have and may continue evaluate a packaging's ability to endure the drop tests which are found in 49 CFR 178.603, and that a great deal of variability would exist with respect to the test results obtained if one where to employ the previously mentioned test methods and procedures. Furthermore, there is little chance that a uniform level of transport safety can be maintained due to these inconsistencies. Please do not hesitate to telephone me at (714) 582-6289 , if you wish to discuss these thought-provoking matters in greater depth.

Sincerely,

Bobby Roper